AEROLOGICAL OBSERVATIONS

[The Aerological Division, W. R. GREGG, in charge]

By L. T. SAMUELS

The free-air temperature for the month averaged decidedly below normal at most stations (Table 1.) The only positive departures occurred in the upper levels at Pensacola. The largest negative departures occurred at the northern stations. Extremely low free-air temperatures were recorded during the month and these exceeded any recorded during the past winter at Chicago and Cleveland from 1 to 4 kilometers, at Dallas from 1 to 2 kilometers, and at Omaha from 2 to 3 kilometers.

Relative humidities averaged mostly above normal, with the largest positive departures at the northern stations.

Free-air resultant wind velocities for the month were considerably above normal between 1 and 4 kilometers. (Table 2.) Resultant wind directions were close to normal at practically all stations.

Airplane observations were made every day during the month at Cleveland, Dallas, and Omaha and on 29 days at Chicago. The highest mean altitude obtained was 5,579 meters above sea-level at Dallas and the highest single flight was also made at this station and reached 6,207 meters above sea level.

TABLE 1.—*Free-air temperatures, and relative humidities, during March, 1932*

TEMPERATURE (° C.)

Altitude (meters) m. s. l.	Chicago, Ill. (190 meters) [1]		Cleveland, Ohio (245 meters) [1]		Dallas, Tex. 149 meters) [2]		Due West, S. C. (217 meters)		Ellendale, N. Dak. (444 meters)		Hampton Roads, Va.[3] (2 meters)		Omaha, Nebr.[4] (299 meters)		Pensacola, Fla.[3] (2 meters)		San Diego, Calif.[3] (9 meters)		Washington, D. C.[3] (2 meters)	
	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal
Surface	−4.1	−7.9	−2.8	−6.6	6.8	−5.1	7.7	−3.0	−7.3	−5.3	5.1	−1.5	−3.0	−6.0	11.1	−0.2	15.3	−0.2	1.7	−4.2
500	−4.7	−6.3	−3.3	−4.9	7.6	−2.7	7.1	−1.9	−7.9	−5.7	3.1	−2.3	−2.9	−5.3	10.0	0.0	12.7	−1.3	0.6	−3.0
1,000	−6.4	−6.0	−5.0	−4.6	7.5	−1.2	5.0	−1.5	−10.6	−7.1	1.0	−2.0	−3.4	−4.3	9.3	+1.2	11.5	−1.3	−1.0	−2.5
1,500	−7.3	−5.4	−7.0	−5.1	6.2	−1.1	3.0	−1.2	−10.6	−6.0			−4.1	−4.4						
2,000	−8.4	−4.8	−7.8	−4.2	4.4	−1.3	0.8	−1.2	−11.8	−5.4	−3.5	−1.9	−4.9	−3.5	7.1	+2.4	7.7	−0.3	−4.4	−1.5
2,500	−10.4	−4.6	−9.2	−3.4	2.1	−1.3	−1.0	−0.8	−13.5	−4.7			−7.0	−3.1						
3,000	−13.0	−4.8	−11.6	−3.4	−0.6	−1.5	−3.5	−1.1	−15.5	−3.9	−7.6	−1.4	−9.8	−3.3	3.3	+2.3	1.7	−0.4	−7.6	−0.7
4,000	−19.1	−5.8	−17.7	−4.4	−7.4	−2.6			−20.3	−3.3			−16.2	−4.4	1.5	+5.4	−5.8	−0.4		
5,000	−28.4	−8.9	−24.3	−4.8	−15.1	−4.5							−23.2	−4.8						

RELATIVE HUMIDITY (PER CENT)

Surface	72	0	83	+11	75	+4	64	0	80	+7	68	+4	78	+10	76	+4	70	+5	67	+2
500	68	−3	81	+10	68	−1	57	−4	80	+8	65	+7	76	+9	68	+4	69	+6	65	+2
1,000	65	−1	80	+14	58	−2	53	−6	79	+15	65	+9	69	+8	61	+4	60	+8	63	+2
1,500	61	+2	78	+19	53	+2	51	−7	69	+11			60	+8						
2,000	53	−2	70	+15	48	+5	44	−10	66	+10	64	+12	57	+7	48	0	40	+3	58	+1
2,500	50	−3	65	+12	46	+7	41	−9	62	+6	62		56	+6						
3,000	47	−6	63	+10	48	+11	38	−6	58	+1	53	+8	57	+6	46	+4	32	+2	49	+1
4,000	44	−6	58	+8	48	+9			73	+20			58	+8	38	−5	32	+2		
5,000	54	0	58	+4	45	+6							57	+7						

[1] Normals for Royal Center, Ind., used.
[2] Normals determined by interpolating between those for Groesbeck, Tex., and Broken Arrow, Okla.
[3] Naval air stations.
[4] Normals for Drexel, Nebr., used.

TABLE 2.—*Free-air resultant winds (meters per second) based on pilot-balloon observations made near 7 a. m. (E. S. T.) during March, 1932*

[Wind from N=360°, E=90°, etc.]

Altitude (meters) m. s. l.	Albuquerque, N. Mex. (1,528 meters)		Bismarck, N. Dak. (518 meters)		Brownsville, Tex. (12 meters)		Burlington, Vt. (132 meters)		Cheyenne, Wyo. (1,873 meters)		Chicago, Ill. (198 meters)		Cleveland, Ohio (245 meters)		Dallas, Tex. (154 meters)		Due West, S. C. (217 meters)		Havre, Mont. (762 meters)		Jacksonville, Fla. (14 meters)		Key West, Fla. (11 meters)	
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
	°		°		°		°		°		°		°		°		°		°		°		°	
Surface	33	0.3	318	1.6	252	0.6	286	2.3	289	5.9	293	1.4	273	2.8	307	0.8	265	2.3	250	1.6	283	1.6	9	0.7
500			145	2.0	284	4.7					296	4.2	275	5.1	263	2.2	272	5.5			285	4.3	214	0.5
1,000			319	6.0	224	1.0	304	7.2			290	5.6	278	7.9	272	5.1	276	6.8	268	3.2	269	6.5	221	3.6
1,500			312	7.6	282	2.9	303	9.8			299	11.4	282	8.9	298	6.6	280	8.7	301	6.7	270	8.2	223	4.2
2,000	294	3.9	311	10.0	264	4.4	308	11.0	288	8.8	298	12.0	288	10.8	308	7.8	282	12.4	305	7.9	285	12.1	225	5.0
2,500	299	8.1	319	10.6	276	5.7	304	12.2	291	13.2	289	15.4	294	12.6	302	8.5	281	12.6	291	9.2	280	14.6	238	4.9
3,000	306	10.4	315	12.2	295	8.5	294	12.5	295	13.4	291	16.0			287	10.9	277	13.1	298	9.0	271	14.5	239	3.7
4,000	293	13.6							294	12.9					284	14.2	279	17.0					291	8.7
5,000	276	13.6							275	12.5							259	22.4						

TABLE 2.—*Free-air resultant winds (meters per second) based on pilot-balloon observations made near 7 a. m. (E. S. T.) during March, 1932*—Continued

Altitude (meters) m. s. l.	Los Angeles, Calif. (217 meters)		Medford, Oreg. (410 meters)		Memphis, Tenn. (85 meters)		New Orleans, La. (25 meters)		Oakland, Calif. (8 meters)		Oklahoma City, Okla. (392 meters)		Omaha, Nebr. (299 meters)		Phoenix, Ariz. (356 meters)		Salt Lake City, Utah (1,294 meters)		Sault Ste. Marie, Mich. (198 meters)		Seattle, Wash. (14 meters)		Washington, D. C. (10 meters)	
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
	°		°		°		°		°		°		°		°		°		°		°		°	
Surface	321	1.8	226	0.5	331	0.7	10	0.6	76	0.8	344	1.0	351	2.3	102	1.7	100	0.6	17	0.7	182	2.3	283	2.6
500	7	1.5	211	0.3	257	4.0	269	1.8	340	2.0	272	0.9	323	3.3	108	0.7	------	------	356	1.0	193	5.6	291	8.3
1,000	1	2.8	151	1.1	272	6.9	252	3.4	354	4.2	285	4.6	296	8.0	317	1.5	------	------	298	2.8	207	5.9	285	12.3
1,500	358	3.3	229	2.8	282	9.6	270	6.9	329	4.2	284	5.4	299	11.1	333	3.2	204	0.8	305	5.4	191	4.9	302	15.7
2,000	356	4.6	275	4.5	289	10.2	293	10.1	331	5.4	287	7.2	298	13.0	311	4.0	277	3.2	308	8.0	217	3.5	291	14.9
2,500	341	4.7	287	7.2	305	11.9	282	13.0	328	6.3	294	9.4	300	13.5	312	5.1	290	4.3	320	9.0	250	4.1	255	8.4
3,000	329	4.5	296	9.2	------	------	278	13.4	320	7.9	286	12.1	307	17.1	304	4.3	297	6.5	320	9.8	253	4.9	286	19.3
4,000	298	5.8	299	10.2	------	------	280	19.9	310	8.5	------	------	------	------	303	9.3	306	9.2	------	------	------	------	------	------
5,000	------	------	------	------	------	------	------	------	------	------	------	------	------	------	299	9.5	------	------	------	------	------	------	------	------

WEATHER IN THE UNITED STATES

THE WEATHER ELEMENTS

By M. C. BENNETT

GENERAL SUMMARY

The monthly mean temperature for March was decidedly below the normal in all sections from the Rocky Mountains eastward. A number of Southern States reported the lowest March temperatures of record during the first half of the month. Freezing weather extended southward to the extreme lower Rio Grande Valley. In the interior valleys the average temperatures for the month were from 5° to 9° below the normal. On the other hand, the average for the month in the Pacific coast area was slightly above the seasonal average.

The precipitation for the month was very irregularly distributed. In most of the Atlantic area, much of Florida, the lower Mississippi and the upper Ohio Valleys, the monthly totals were above normal. In the western Ohio, central Mississippi and lower Missouri Valleys, and portions of Texas and Oklahoma they were below the normal, while the Pacific Northwest had more than normal, but the far Southwest was generally dry, while the southern portions of Arizona and California received no precipitation throughout the month. Snowfall was heavy in portions of the Northeast and much of the Lake Region, with as much as an inch occurring as far south as Palestine, Tex., and measurable amounts to Corpus Christi, Tex., and Montgomery, Ala.

For the first time in more than a year an important group of destructive local storms was reported. (See article on p. 89 of this REVIEW.)

TEMPERATURE

March was in marked contrast with the winter months which had just preceded, being colder than normal in all sections save the far West. In much of the Lake, central valley, middle Appalachian, and southeastern regions it was the coldest month of the whole cold season.

The first few days were cold in most of the far West, but quite mild nearly everywhere from the Plains eastward. By the 4th decidedly cold weather had set in over the northern and central Plains. It extended southward and more gradually eastward, the Northeastern States coming under its sway on the 7th or 8th. Generally, the period from the 6th to the 15th was the coldest or almost the coldest 10-day period ever recorded in March in the central and southeastern portions of the country. At Huron, S. Dak., this period averaged 15° colder than normal; at San Antonio, Tex., 20° colder; at Cairo, Ill., 19° colder; and at Savannah, Ga., 15° colder. In the far Northwest this same period was mainly cold till the 13th, except close to the coast, but from the 13th onward was about normal in both coast and interior sections, while in the far Southwest temperatures were mainly above normal, particularly in California.

The second half of the month saw moderate variations of temperature in most sections, but was largely warmer than normal from the Pacific to the Plains, especially in California and Montana. In the eastern half of the country a few districts in the lower Mississippi Valley and the South Atlantic States averaged slightly warmer than normal, but mainly this period was colder than normal, particularly in the Lake region, the upper Mississippi and upper Ohio Valleys, and the interior portions of New York and New England.

March averaged somewhat warmer than normal in California, most of Nevada and western Arizona, and between the Cascade Mountains and the Pacific coast. In practically all other regions it was colder than normal and save in the Plateau region, some Atlantic States, and part of the Missouri Valley, at least 4° colder. From South Dakota, Nebraska, and Kansas eastward to Lake Michigan and the upper Ohio Valley the deficiency was usually 6° to 8° per day. In parts of the upper Mississippi Valley very few Marches have averaged colder than this one.

The highest temperature reported was 102° at two Texas stations on the 20th. In numerous States the highest marks were in the eighties, but from North Dakota to New York and New England they were generally in the sixties. Several Southeastern States noted their highest readings during the first three days, but the southern half of the country otherwise about the 20th, and the northern half largely during the final three days.

Save in the Northeast and North Dakota the lowest marks were recorded during the first 12 days. In most of the Southeast they were between zero and 25°, and came usually on the 10th, when numerous stations approached the lowest March temperatures of record. Apart from the Southeast nearly every State recorded a zero temperature, the very lowest reported being −43° at Riverside, in Yellowstone National Park, on the 11th.